



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

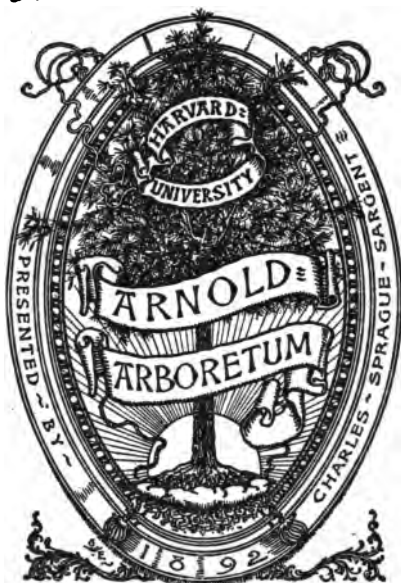
Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>

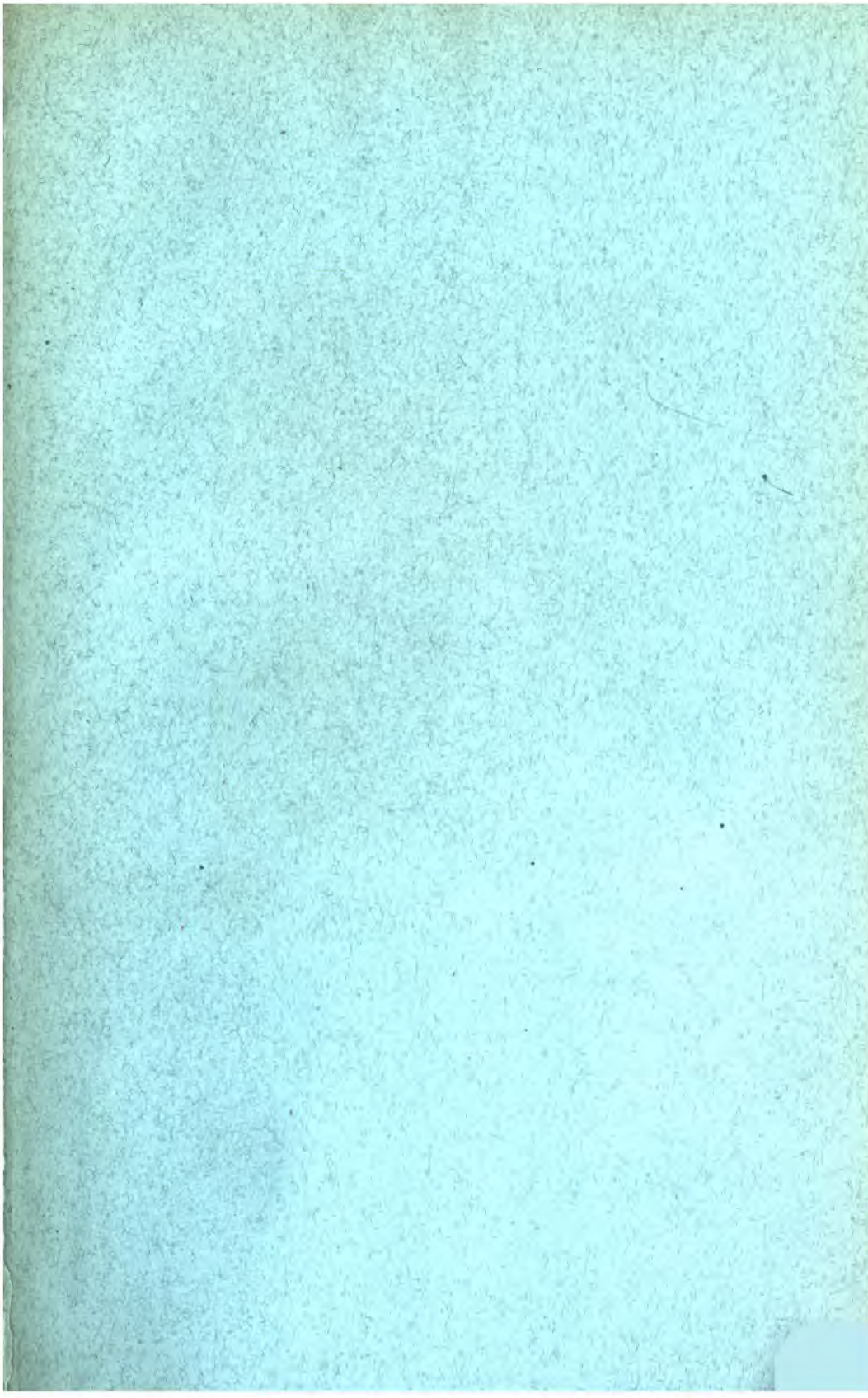


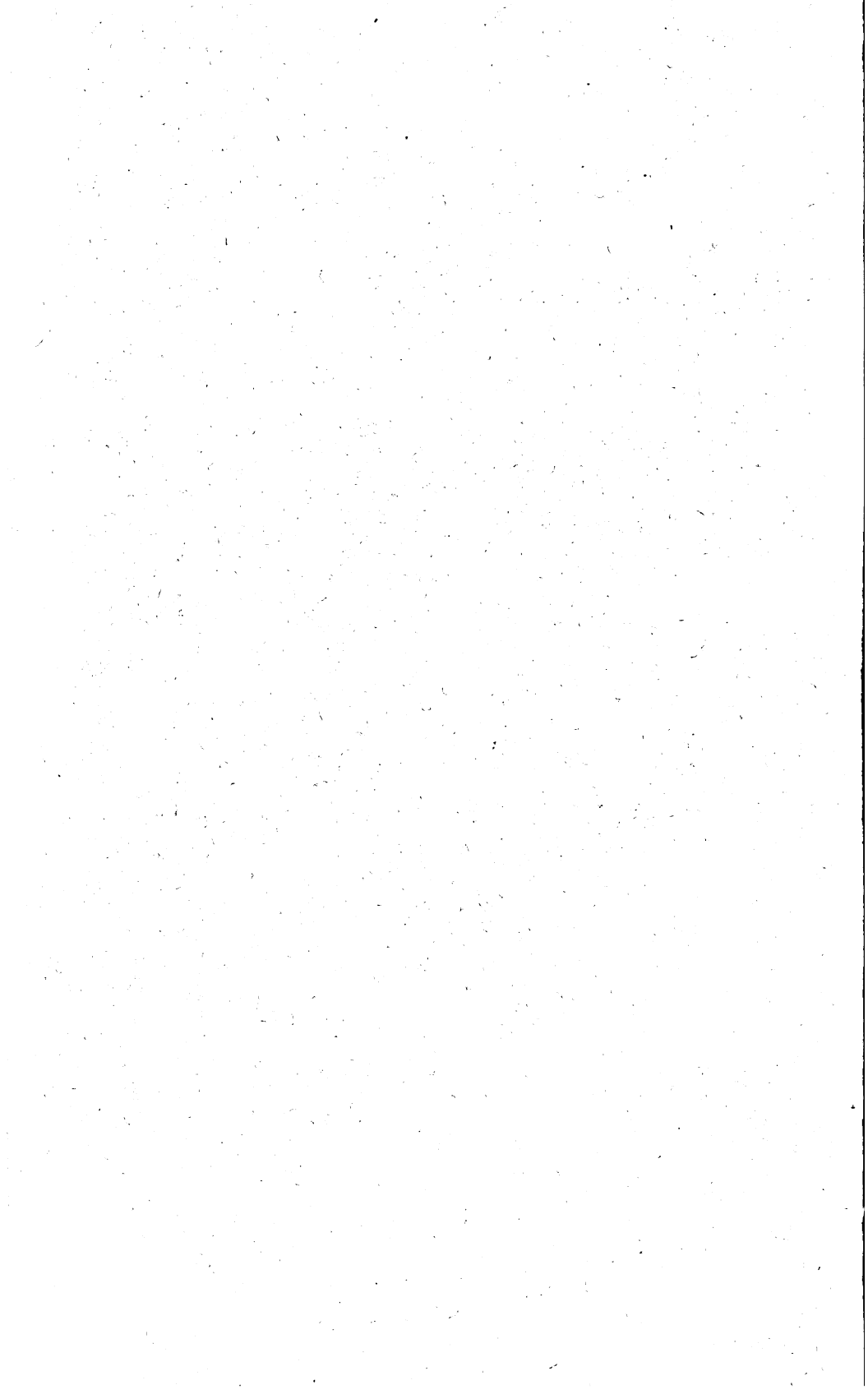


3 2044 106 369 481

Bib1.
G83







BIBLIOGRAPHICAL DIFFICULTIES IN BOTANY.

A PAPER READ BEFORE THE BOTANICAL SOCIETY OF AMERICA, AT ITS
ANNUAL MEETING, AUGUST 18, 1897, AT TORONTO, CANADA.

By

EDWARD L. GREENE, LL. D.,

[*Reprinted from the Catholic University Bulletin, Vol. IV., pp. 62-75.*]

WASHINGTON:

1898.

BIBLIOGRAPHICAL DIFFICULTIES IN BOTANY.¹

Nothing in all the history of science in America is more remarkable than what the last quarter of this closing century has witnessed in respect to a strong revival among us of an interest in systematic botany, and a sudden and large increase in the number of efficient workers along these lines. Fifteen years ago there could scarcely have been named ten men who were in this country giving much time and attention to our flora from a taxonomic point of view. To-day there are probably not less than a hundred zealously engaged in field, library, and herbarium, upon the life history and the written history of our plants and trees. After about a half-century of actual steady decline of interest in these subjects, and of gradual decrease in the number of active botanists, all at once times like those of seventy years since are upon us; the times of Michaux, Pursh, Nuttall, Elliott, Muhlenberg, Rafinesque, De Schweinitz, Le Conte, and their less famous but numerous co-workers of the first decades of the century. For now the number of our botanical students and authors is multiplied quite in the ratio of the increase of our population since 1820.

And this new generation is learning what the earlier one well understood—that the study of any plant's life history and taxonomy must proceed along with its written, or bibliographic history. This necessity of bibliographic work, with its manifold difficulties, comes of the importance of a precise and uniform nomenclature in botany. There is, of course, no science without its nomenclature and terminology. And in botany nothing can be done, at least no results of research can be communicated, apart from the names of the plants or groups of plants which have been under investigation. Just as the correct and full and true name of any man is a kind of necessity of his existence as a member of society, so the name of the family, of the genus and of the species to which any tree or

¹ Read before the Botanical Society of America, at its annual meeting, August 18, 1897, at Toronto, Can.

shrub or herb, belongs is indispensable to a scientific, or indeed any kind of, understanding and discussion of it. And, as the individual member of human society has each his own name, and that name is fixed, and a matter of record, at least in the minds of as many as know him, so each specific member of the plant kingdom has its own rightful name, a name assigned, or at least recorded, at some time in the near or remote past; a name which is therefore a thing with a definite history, and a matter of bibliography. Bibliographic problems in botany are therefore as important, to say the least, as is botanical nomenclature. And without botanical nomenclature the science itself is simply impossible. But botanical nomenclature means, or ought to mean, the same name for the same group of plants, for all botanists of whatever language or nation. This is agreed to by all. And it is, in a general way, as universally conceded that, under certain limitations, and with important exceptions, the scientific name of every plant species is determined by the principle of priority of publication. It is these admitted principles which, together with the long history and the immense literature of systematic botany, have placed taxonomic research, as we now try to carry it on, under many and very perplexing bibliographic difficulties.

Here let me state more precisely those nomenclatorial principles, the application of which involves so much of difficulty, owing to the mere vastness of good, accredited and indispensable botanical literature. The principles are three: (1) the employment of Latin as the language of plant names; (2) priority of publication, and (3) the binary character of all species names, as being made up of a genus name of one term and a species name of one term. These principles are at the foundation of nomenclature, and are fundamental in about the order here indicated. A plant is to be catalogued, and spoken of, or written of, under its oldest published Latin generic name of one term combined with its earliest published Latin specific name of one term. Our North American White Oak, for an illustration, is known to all botanists throughout the world by the binary Latin name of *Quercus alba*, *Quercus* being the classic Latin name of the genus, and *alba* the first Latin name

of one term for this particular species which obtained publication. This name was definitely assigned this important species by Linnæus in the year 1753, and is universally received as *the name* for it among all botanists. Of course if the principle of priority were absolutely fundamental, this could not be its name, for it was known, and doubtless written about, under the English name of *White Oak*, long before Linnæus. But systematists, writing for the whole fraternity of botanists, may not employ this most ancient and perfectly binary name, because it is not in the universal language of plant nomenclature. Both priority and the principle of binarity are here shown as necessarily subordinate to the principle of Latinity. Yet again, the excellent Latin name of *Quercus alba Virginiana* given by Catesby enjoys priority of publication over the Linnæan name for the species, yet is rejected because it is not binary but ternary; and in this and like instances both priority and mere Latinity are seen to have been made subordinate to the united qualities of Latinity and binarity found in the Linnæan name of *Quercus alba*.

In explanation of the actual situation of American botanists, as facing mountains of bibliographic difficulty in their attempts to correct, settle and harmonize our plant nomenclature, it may be charged against our botanists of earlier generations that, while faithful to the principles of Latinity and binarity, they were all too indifferent to matters of priority, often assigning new names to old species, which names now, after years of currency, must be suppressed and the prior ones restored to the annoyance of all except the few more learned and critical whom changes in nomenclature do not disturb.

To that generation of American botanists which began its work early in the last quarter of the nineteenth century will always be given the credit of having attempted to settle the nomenclature of our vast flora bibliographically, by applying the principle of priority of publication, as a test of the validity of names. The work was undertaken concertedly, by a very large majority of the working botanists of the time, even including a number of those who had shared in the labors of an earlier generation, and it has progressed rapidly. But the results might have been better, had the laborers fore-

seen at the outset what numerous and grave obstacles to easy success lay before them in the shape of hard bibliographic problems.

Before the convening of that noted public meeting which, in the summer of 1892, formulated and approved what have been called the Rochester Rules, it had come to be apprehended that the difficulties of bibliography might prove in the aggregate, discouragingly numerous and many of them insuperable; and so it was voted to make the year 1753 the initial date from which to work for the correcting and reforming of botanical nomenclature. This, it seems to have been believed, would obviate the necessity of the study of that vast aggregate of botanical literature which had been published in the sixteenth and seventeenth centuries and the first half of the eighteenth, and thus the great bulk of hard nomenclatural problems would be ruled out of all consideration.

The year 1753 is ever memorable in the history of botany. It is the date of the publication of Linnæus' *species Plantarum*, the work in which all the species of plants then known are designated each by the double name, the generic and the specific, each of one term. This binary nomenclature, although it had been nearly universal two centuries earlier than 1753, was in need of restoration and completion; and Linnæus in this work approximately completed such reform. And yet the selecting this work as the one from which to reckon priority in binary nomenclature, while seeming to evade the necessity of studying and correlating laboriously the voluminous literature of more than two earlier centuries, yet involved some new and peculiar difficulties of the same kind; difficulties hardly apprehended by many, if by any, of those who approved the choice of the new bibliographic starting point. For the first and most important part of the plant name is its genus name; and the genera of Linnæus are of the worst, as to their definition and delimitation. For example, the pretended genus to which he assigns the name *Erysimum* is made up with him of four species; but each of these species, according to the best pre-Linnæan authorities upon plant genera, as well as by the consensus of recent opinion, represents a distinct genus. His *Erysimum*, then, is no genus, but a confused mixture of the

four genera *Erysimum*, *Barbarea*, *Alliaria*, and *Cheiranthus*. Here, then, the bibliographer is in trouble. For what one of these four separate generic types shall the name *Erysimum* be retained? The situation is not an extraordinary one. Its like is familiar to every systematic botanist of experience. The natural way out of the difficulty is that of recognizing the first species listed under a generic name, as the type of the genus, and the one to be maintained as representing it, in case others are excluded from it. Number V of the Rochester Rules explicitly recognizes and approves this principle. Yet, in the case of every book and catalogue published by Rochesterians since the enactment of their code, in which the genus *Erysimum* occurs, this principle is violated, and the last species—the *Cheiranthus*—is forced to stand for *Erysimum*.¹ Why is this? What bold array of obstacles confront the rank and file of the reformers of nomenclature, to deter them from applying here and elsewhere, when the Linnæan book of 1753 is concerned, the rule regarding type-species as determinative of the use of a generic name? We may perhaps find a hint of the answer by looking further at the composition of the genera, so-called, of the book of 1753. The *Senecio* of that noted volume has for its type what has long been known as *Erechtites hieracifolia*. Evidently no author is found bold enough to accept the small genus *Erechtites* as the real *Senecio*, seeing that such a movement would entail the dread necessity of placing under some other genus name, and specifically re-naming, the more than a thousand species now ranged by all authors under *Senecio*. In precisely the same manner, as it turns out, the *Trifolium* of the 1753 book is, as to its type species, *Melilotus*, the *Gnaphalium* is *Antennaria*, and the *Aster* is the South African genus *Felicia*. The reformation of nomenclature on this bibliographic basis, from the 1753 date as initial, would involve a greater revolution than that effected in his day by Linnæus himself. The bibliographic difficulty of the situation is so prodigious, that the rule which entailed it all is become, in less than five years from its passage, a dead one, as regards the use of the chief book concerned; and no other

¹See *List of American Plants*, compiled by Dr. Britton and others, 1893-1894; also Britton & Brown. *Illustrated Flora*, ii, 151, 1897; and *Contributions from U. S. Herbarium*.

rule has been suggested publicly as a plausible one to take its place.

Difficulties of this class all vanish instantly if, with almost all botanists of the past two centuries, we take Tournefort and his immortal *Institutiones* of the year 1700 as the bibliographic starting point for the genera of plants; and a return to that initial date, on the part of those who have swerved from it, is inevitable, unless reason and good sense are to be denied their legitimate exercise.

In the segregation of species, the critical phytographer encounters another class of bibliographic difficulties more troublesome a great deal than those above indicated; difficulties from which there is no one easy avenue of escape; problems susceptible of being solved, nevertheless, if only the student have all the books, all the linguistic learning, all the field knowledge of living types, and all the time and patience necessary. This class of difficulties will also be best illustrated by taking up one or more special cases.

Every student of North American botany during the last one hundred and forty years or more has known a native violet which he has called *Viola palmata*, attributing to Linnæus the authorship of the species, as such, and its name. Yet it may be believed that not one among all these botanists of the eighteenth and nineteenth centuries, knowing our several palmated violets, could say positively which one of these it was which Linnæus intended to designate by that specific name *palmata*. From the account which he gives of it, by bibliographic citation and otherwise, the problem is one of great difficulty. From the language of the specific character alone it would be forever impossible to ascertain which one he meant; for that language is merely this: *V. acaulis, foliis palmatis, 5-lobis dentatis indivisisque*. He adds that the species is a native of Virginia. Now, within the territory embraced by "Virginia" of Linnæus¹ time there occur more than a half-dozen species of the genus *Viola*, any one of which or all of which may possibly have been included by the author mentioned under his name and definition of *V. palmata*. His description is loose enough to cover the whole lot. *V. asarifolia*

Linn. Sp. Pl. 933.

of Pursh and of Schweinitz, *V. triloba* of Schweinitz, *V. heterophylla* of Muhlenberg, *V. septemloba* of Le Conte, *V. emarginata* of Le Conte, and *V. Atlantica* of Britton,—any and all of these, in certain of their common forms, fall under the Linnæan diagnosis of *V. palmata*. Any one of them may have been the type of his species, if his species had a type. Each one of them responds well enough to the character of a “stemless *Viola* with leaves varying from uncut and merely toothed, to 5-lobed and palmately cleft.”¹

The perplexities of this particular situation have not been newly discovered. They must have confronted all those earlier authors, Pursh, Muhlenberg, Schweinitz, and Le Conte, who made special investigation of our violets. The old *Species Plantarum* was their manual, in those days, as it has not been with any later generation; as it will not be to any future one. Not one of them would have ventured to name as new a *Viola* species of the *V. palmata* group until he had first satisfied himself as to just what form was entitled to bear the name assigned by Linnæus.

We must now make a full presentation of the actual data by which the *V. palmata* is to be identified, if at all. The question, happily, does not rest alone on that technical but vague diagnosis which Linnæus himself framed. It is, like most of that author's species, whether pure and genuine, or aggregate and confused, a bibliographic species. It is to be identified, not by what Linnæus said about it for himself, but by a study of the older authors whom he cites in fuller illustration of his own meaning. Here is the whole of his paragraph:

VIOLA (palmata) acaulis, foliis palmatis, quinque-lobis, dentatis indivisisque.
Viola foliis palmatis sinuatis, stolonum reniformibus. *Gron. Virg.* 182.
Viola Virginiana, platani fere foliis parvis et incanis. *Pluk. Mant.* 187.
Viola alba, folio securis Romanæ effigie, Floridana. *Pluk. Amalt* 209. *t.* 447.
f. 1.
 Habitat in Virginia.

This shows that the author under examination, having framed for his *Viola palmata* a diagnosis of his own, supplemented that by citing below it three other and earlier diagnoses

¹A free but accurate version of the Linnæan diagnosis of *V. palmata*.

of what he took to be the same species. Let us see how these earlier authors as cited by him may help us in our efforts to determine the true *V. palmata*. The first citation is from Gronovius *Flora Virginica*, a work which had served as a manual of Virginian botany with Linnæus for about fourteen years before 1753. And it may at once be seen that Gronovius' descriptive power in botany surpasses that of Linnæus. His description is shorter, yet decidedly more definite; for he tells the palmated violet has its main leaves *sinuately* palmate and that its earlier ones are uncut and *reniform*. By virtue of those two words of Gronovius which I have put in italics our whole difficulty with the Linnæan *V. palmata* is reduced one-half. Three of the seven species which might have fallen under Linnæus' loose description are excluded. *V. emarginata*, *V. septemloba*, and *V. heterophylla* never exhibit either reniform early leaves, or sinuately palmated ones at any stage. Our possible representatives of the Linnæan species *V. palmata* are thus reduced to four: *V. triloba*, *V. asarifolia* and *V. Atlantica*, and one other, which have some early leaves reniform. Let us now critically consider the second citation which Linnæus gives to help us in the identification; that of Plukenet's *Mantissa*. This plainly indicates a plant with main foliage cut into the shape of those of a *Platanus*, or sycamore. We must now look for a violet of that leaf pattern. I suppose that forty-nine out of fifty of American botanists would at once institute a comparison of the leaves of this native violet of ours with those of our native sycamore, *Platanus occidentalis*; and this would put an end to all critical study of this Plukenetian diagnosis in relation to *V. palmata*; for there is no violet in America with anything approaching that pattern of leaf. But Plukenet had never seen that tree. *Platanus* with him meant simply the Old World species of that genus, the *P. orientalis*, with whose foliage he was perfectly familiar. It differs notably from ours in having a palmated leaf; and this is the foliage to which that of our violet is compared as to its cut.

Now we have in North America only two *Viola* species—and these may possibly be but different forms of one—with sinuately palmated late summer foliage. One of these is *V.*

Alantica.¹ The other differs from it only, or at least more notably, in being pubescent; typical *V. Alantica* being glabrous. Assuming, as we are almost obliged to, that Plukenet knew both these forms, and distinguished them, as he certainly appears to have done, which is to be taken for typical *V. palmata*, Linn? This is the most important of all the bibliographic questions presenting themselves in this example of book research. We began with seven very definite provisionally named *Viola* forms, any one, or all of which might represent that vague and most indefinite *V. palmata* of the diagnosis framed by Linnæus. By the help of bibliography placed at our service by that author, we have reasonably excluded all but two. Which one of these two is to bear that name? Both are certainly included under that name by Linnæus. They are to be segregated, and the name be left to one of the segregates. Shall it be left to designate the pubescent form or the glabrous one? Priority can not be brought in to aid in a decision; but precedence can; and precedence is accepted generally as the equivalent of priority. By this test the hairy plant, the one described as with *foliis incanis*, is to hold the name *V. palmata*, and the recently assigned name, *V. Atlantica* holds good for the glabrous form. To be sure, the only figure which Linnæus quotes as authority for his *V. palmata* is that of a glabrous plant, and really represents *V. Atlantica*; so that, had Linnæus but given, in his bibliography of *V. palmata*, precedence to Plukenet's plate 114, figure 7, we should have been compelled to accept *V. Atlantica* for the type of *palmata* and reject the name of recent publication. But we must not, I should say, yield up the law of precedence as actually decisive in these cases. And I say this in full view of the fact that a figure cited is, now and then, found to be the only means of settling such a bibliographic question. But here it is not necessary.

I have given this specific case of a bibliographic problem as one fully illustrative of the library equipment, the field knowledge of the subjects, the careful and critical use of descriptive phrases, and the use of the principles of priority and precedence, by means of which the taxonomist may settle the

nomenclature of segregates where one of them is to bear a specific name imposed by Linnæus. Were it needful, I could as readily adduce a dozen others; but I shall here suggest but one other illustration of my topic.

In our country, the Asters form one of the most engaging groups of plants for taxonomic study. I do not believe that they are naturally half so difficult as, during the last generation of American botanists, they were given the reputation of being. But, if we are to endeavor to retain in use, and rightly apply, the names that have been assigned to species during the last 140 years,—and we are all agreed that this must be done,—the bibliographical difficulties in the genus are almost appalling. Of species indigenous to the Eastern and Southern United States and Canada, Linnæus published in 1753 about eighteen. His descriptions of these consist of from one to three or four lines in large type for each species. But there are hardly three out of the eighteen whose essential characters can be stated in so few words. Practically these diagnoses are worthless; and I may safely say there is no botanist living who, with nothing but Linnæus' *Species Plantarum* to guide him, could determine as many as three of the Linnæan Asters; so that his familiar binary names would have been *nomina nuda*, had not the author referred his students to all the old pre-Linnæan and better descriptions, and to the figures that accompany them. For thirteen out of his eighteen North American Asters he refers us to figures of Cornuti, Paul Herman, Morison, Plukenet, and Dillenius. Thus the identification of the Linnæan species depends upon little study of Linnæus, but much and most critical study of five celebrated pre-Linnæan Aster students whose works are rare and costly. And though our *Aster* species have been investigated repeatedly, in the light of full library equipment, by most competent phytographers, it may still be said that not more than three or four of those eighteen Linnæan species are at this day identified with certainty. And if these, *A. concolor*, *puniceus*, *cordifolius* and *Novæ-Angliæ*, are not open to question as to their identity, that is owing to the perfection of certain pre-Linnæan figured representations of them which the Swedish nomenclator indicates as his types. But in regard to other

species by the same author, species whose names are just as familiar, such as *A. undulatus*, *ericoides*, *Tradescanti*, *miser* and *dumosus*, the literature of the present indicates that their identity has been differently made out by different critics; and so the most patient and thorough field and library study must be undertaken in the case of each one of a dozen or more of the Linnæan species of this genus before we shall arrive at the very first beginning of a correct and stable nomenclature of this engaging genus. Each must be taken up and its bibliographic sources studied page by page and word by word, after the manner exemplified here in the case of *Viola palmata*. Let me, before leaving this instance of bibliographic difficulty in botany, recall a few instances of others' attempts and failures in such work. The late Asa Gray labored at intervals during more than a half-century of his career on the problems of the identity of *A. Tradescanti*, *A. miser*, and others like them. As to the first of these two, in 1843 he was confident that the name belonged to a certain very common *Aster* equivalent to the *A. vimineus* of Lamarck;¹ a conclusion which he had reached after a laborious examination of all the data to be found in European libraries, herbaria and botanic gardens. More than forty years later, and presumably profiting by riper experience—or possibly after having lost somewhat of the earlier zeal for careful critical work—he assigns the name *A. Tradescanti* to a widely different species,² admitting the one which he had called by that name all his life and had taught others so to call, to be a species distinct. Similarly with this other, the *A. miser*; during the greater part of his lifetime, in all his works, he designated a certain very common and widely dispersed *Aster* by that name, asserting that this must have been the plant so named by Linnæus; then in his last masterpiece of systematic botany, he assigns this thing another name, even declaring his belief that the *Aster miser* of Linnæus was a fiction, and the name to be dropped out of botany; and yet that *Aster miser* was an *Aster* which Linnæus described somewhat fully. Other like examples of great and scholarly botanists' bibliographic failures, I

¹See Torr & Gray, *Fl. N. Am.* ii, 128 (1841).

²*Syn. Fl. N. Am.* 187 (1884).

forbear to mention. But this kind of investigation must go on, and on, until the truth is reached, and shown to be the truth.

The illustrative problems herein presented should, however, serve as a strong intimation to the younger and less experienced of our taxonomists of the magnitude and the complexity of various unavoidable bibliographic problems. And they are extremely numerous. Almost an infinitude of them will be found attending new effort to classify plants and establish the species under the names which belong to them according to priority.

Under that strong revival of interest in botany amongst us, to which I made allusion at the outset, it is being shown in many published revisions, that many genera which, for a hundred years anterior to our day, were deemed monotypical, or consisting of only two or three species, contain demonstrably twice or thrice as many—species which our forefathers indistinctly knew, but confused as one. But this excellent work of patient, persistent field study and comparison, and consequent segregation, however necessary, can not proceed securely as to the nomenclature of the species, nor will the labored revisions of genera be found stable in all their results, unless more care shall be used than has been used, in ascertaining which and what of the newly offered segregates are really the old original species.

Great difficulty is by no means always incident to the determining, bibliographically, the earlier published plant-species; and perhaps not many of the difficulties which one meets with in such work are really insuperable. Moreover, what to one botanist may seem a complete bibliographic enigma, another may solve with ease. Here much may depend upon a thorough study—literary study—of different botanical authors. And no man, however keen his botanical eye, or how thorough his field knowledge of the group of plants he may have in hand, should trust himself as able to make out the written history of the species, unless he have much more than a mere smattering of the Latin language.

As I have already shown, the actual determination of hundreds of the Linnæan plant species depends upon some descrip-

tion given by those classic authors, Dodonæus, Ray, Bauhin, Clusius, Plukenet, Micheli, Dillenius, Haller, Le Vaillant, and Gronovius, from whose large and in most cases well written volumes Linnæus in the main compiled his own small and cheap ones. Those sources of almost all the Linnæan botany are all in Latin; a language which each one of those worthies knew so well that each wrote it in his own style. Each of them has, in a degree, his own terminology, too. And, by the way, to Linnæus, the pupil of these greater pre-Linnæans, must be given the praise of having labored very successfully to bring about an unification of descriptive terminology. That was one of the very great services which he rendered to our science. But, we must bear it in mind that, when turning back to a page of Dodonæus, or of Ray, or of Dillenius cited by Linnæus, and thus seeking to ascertain by the earlier author's more full description just what plant Linnæus had in view, we must know how to construe the older author; must have that acquaintance with his style, and with the meaning he attaches to a given botanical term, which comes only by a somewhat special, and partly philological, study of that author.

Just as the master of Latin philology must have close acquaintance with each one of the ancient Latin authors, so should every botanical scholar who would perfectly understand Linnæus, be somewhat philologically familiar with every one of those standard pre-Linnæan authors to whose descriptions of plants Linnæus refers us on every page of his. And so I reiterate it; that a bibliographical problem which nineteen professed botanists may successively have failed to solve, the twentieth man may solve; so much may depend upon the combination of thorough phytological, with accomplished bibliographical skill and knowledge.

I may thus far have seemed to imply that our bibliographic difficulties begin and end with the treatment of Linnæan plant species. I must not leave the impression that such is my meaning. And in order that I may suggest a wider application of much that I have been saying, let me revert to the topic of our *Asters*.

I said that Linnæus published some eighteen of our species,

the greater proportion of which are not to be identified at all except by a careful study of pre-Linnæan pages, and that several of them seem impossible to be determined by any means at all. But what is more discouraging is the fact that, in the next generation of botanists after Linnæus—the generation to which Aiton, La Mark and Willdenow belonged,—the number of American *Aster* species was more than trebled, in publications by the three authors I have named. And two of these authors were so hampered by Linnæan notions about the necessity of extreme brevity in diagnosis, that their *Aster* names are little better than *nomina nuda*. They did not really describe any of their species; and they could not refer to older descriptions, or early published figures, as Linnæus had been able to do. Their *Aster* species were mostly actually new; a thing which can hardly be said of any of those given by Linnæus; but to determine what the plants really are, to which they assigned names, is doubtless in many instances quite impossible. And what is true of the written history of this genus, is, in a measure, true of many another genus with which we botanists of America, at present, and in the future shall have to deal, whose species we shall have to determine, and the names of which, according to priority, we shall have to declare.

These last hints of bibliographic difficulty, I have offered with no view of showing how to seek solution of them. I have merely wished to intimate that they exist, and in lamentable abundance. Their very existence is ignored by some of our otherwise most promising promoters of systematic botany, the literature and taxonomy and nomenclature of which they may be leading, unwittingly, into still more hopelessly complicated and inextricable confusion.

